

Name: _____

at1121exam_practice: Radicals and Squares (v15)

Question 1

Simplify the radical expressions.

$$\sqrt{18}$$

$$\sqrt{44}$$

$$\sqrt{28}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 2}}{3\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 11}}{2\sqrt{11}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 7}}{2\sqrt{7}}$$

Question 2

Find all solutions to the equation below:

$$3((x - 8)^2 - 5) = 93$$

First, divide both sides by 3.

$$(x - 8)^2 - 5 = 31$$

Then, add 5 to both sides.

$$(x - 8)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 8 = \pm 6$$

Add 8 to both sides.

$$x = 8 \pm 6$$

So the two solutions are $x = 14$ and $x = 2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 16x = 80$$

$$x^2 + 16x + 64 = 80 + 64$$

$$x^2 + 16x + 64 = 144$$

$$(x + 8)^2 = 144$$

$$x + 8 = \pm 12$$

$$x = -8 \pm 12$$

$$x = 4 \quad \text{or} \quad x = -20$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 + 28x + 95$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 14x) + 95$$

We want a perfect square. Halve 14 and square the result to get 49 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 14x + 49 - 49) + 95$$

Factor the perfect-square trinomial.

$$y = 2((x + 7)^2 - 49) + 95$$

Distribute the 2.

$$y = 2(x + 7)^2 - 98 + 95$$

Combine the constants to get **vertex form**:

$$y = 2(x + 7)^2 - 3$$

The vertex is at point $(-7, -3)$.